Comparison of daily intake: Vegetarian vs. conventional diet

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INTRODUCTION

Food safety is increasingly receiving attention from the public. Since the beginning of industrialization, many chemical contaminants have been released into our environment and finally arrived to our daily life. Consumers have more and more information about health in their diet, what should be eaten more frequently and what to be reduced. A balanced diet is essential to keep healthy, but balanced does not necessarily mean free of toxics.

As many environmental contaminants are lipophilic and with bioaccumulation ability, they are especially found in fatty foods and in higher trophic levels. This is why the type of diet might be a key factor determining contaminant intake.

This study focuses on the contribution of different foodstuffs to contaminant intake, and more specifically on the differences between vegetarian and conventional diet.

OBJECTIVES

- Establish differences in contaminant intake between vegetarian and conventional diets.
- Assess whether differences on contaminant intake are statistically significant.
- Identify contribution of food groups to contaminant intake.

STUDY DESIGN and METHODS

1. **Contaminants selected**: those usually considered in Total Diet Studies (16 contaminants).
2. **Population studied**: 36 people for vegetarian diet (**V**) and 36 people for conventional diet (**C**).
3. **Foodstuff selected**: based on the feeding habits of Catalan population (11 groups, 63 foodstuffs).
4. **Daily food consumption**: mean of two 24-hours recalls per person.
5. **Daily contaminant intake**: ∑(concentration of contaminant in foodstuffs x daily food consumption).
6. **Testing statistically significant differences between diets**: Mann-Whitney non-parametric test.
7. **Contribution of food to contaminant intake**: relative proportion of the main 5 food types contributing to contaminant intake in each diet.
8. **Dietary exposure assessment**: comparison of the daily contaminant intake –related to body weight- with maximum tolerable daily intake.

and

RESULTS

1. **(a) Heavy metals**: inorganic arsenic (**iAs**), cadmiun (**Cd**), mercury (**Hg**,**MeHg**), lead (**Pb**).
   (b) Persistent organic pollutants: dioxins and furans (**PCDD/F**), polychlorinated biphenyls (**PCB DL**, **PCB NDL**), hexachlorobenzene (**HCB**), perfluoroalkyl substances (**PFOA**,**PFOS**), polybrominated diphenyl ethers (**PBDE**), polychlorinated diphenyl ethers (**PCDE**), polychlorinated naphthalenes (**PCN**).
   (c) Polycyclic aromatic hydrocarbons: benzo(a)pyrene (**B(a)p**), PAH indicators (**PAH8**).

How is the studied population?

2.

	Vegetarian (V)		Conventional (C)	
Women	25	69 %	28	78 %
Men	11	31 %	8	22 %
Total	36		36	

What do they eat?

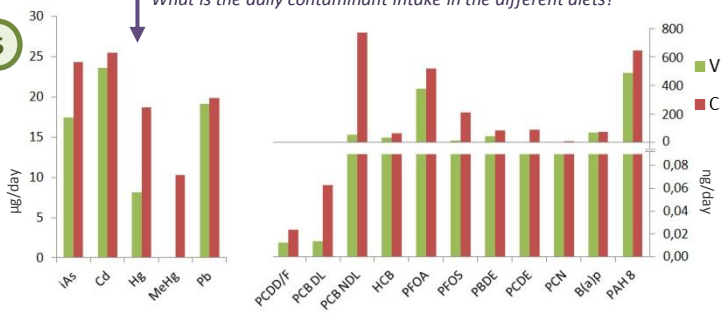
3.

In which proportion under the different diets?

4.

What is the daily contaminant intake in the different diets?

5.



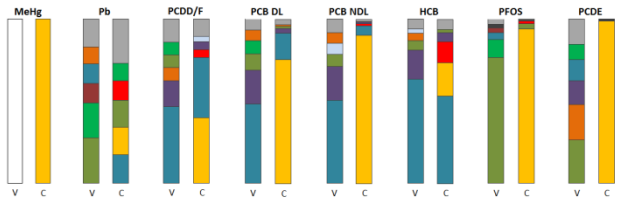
Are these differences statistically significant?

6.

iAs	**Pb**	**HCB**	**PCDE**
Cd	**PCDD/F**	**PFOA**	**PCN**
Hg	**PCB DL**	**PFOS**	**B(a)p**
MeHg	**PCB NDL**	**PBDE**	**PAH8**

How does the food contribute?

7.



Are there appreciable health risks of those contaminants intake?

8. Tolerable daily intake > Daily contaminant intake (V and C)

HEALTH RISK

- Differences in contaminant intake between diets exist, with higher intake in individuals with conventional diet.
- Fish and seafood is the group observed with a higher contribution to contaminant intake in conventional diet.

CONCLUSIONS

Daily contaminant intake is higher in conventional diet than vegetarian in all contaminants. In certain instances there have been found statistically significant differences between diets. Greater intake is mostly associated with fish and seafood for conventional diet and with milk and dairy products and vegetables for vegetarian diet.

Despite differences between diets, none of the estimated intakes exceed toxicological indices, so no health risks are suspected in any of the diets.

Results of the present study support the fact that diet and eating habits contribute strongly to contaminant intake.

REFERENCES: EFSA, FAO and WHO (2011). Towards a harmonised Total Diet Study approach: a guidance document. EFSA Journal 2011; 9(11):2450 // Generalitat de Catalunya. Agència Catalana de Seguretat Alimentària (2008). Contaminants químics. Estudi de dieta total a Catalunya 2005-2007 // Generalitat de Catalunya. Agència Catalana de Seguretat Alimentària (2010). Contaminants químics. Estudi de dieta total a Catalunya 2008 // Generalitat de Catalunya. Agència de Salut Pública de Catalunya. Agència Catalana de Seguretat Alimentària (2013). Pla de Seguretat Alimentària de Catalunya 2012-2016 // Reports of Joint FAO/WHO Expert Committee of Food Additives and EFSA Panel on Contaminants in the Food Chain (CONTAM)